52/126.4 British 1942

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CIFICATION from 50-121 1 SHEET

[This Drawing is a reproduction of the Original on a reduced scale.]

Fig. 1.

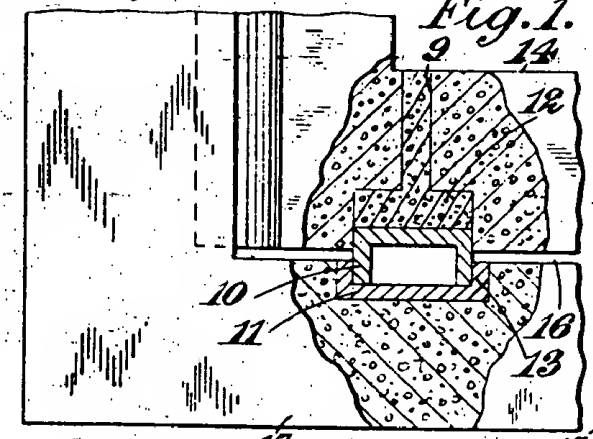


Fig. 3.

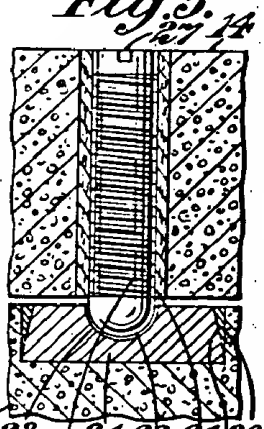


Fig. 2.

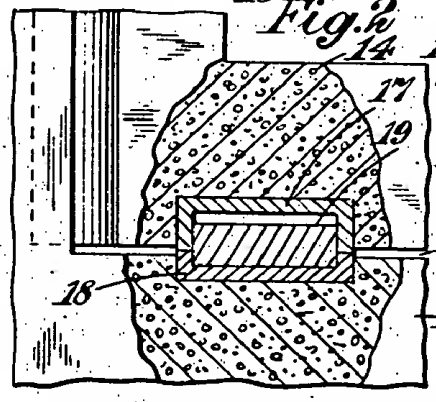


Fig. 4.

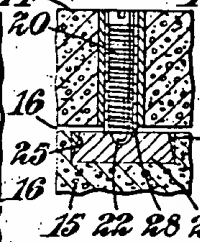


Fig. 5.

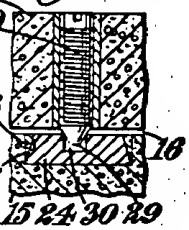


Fig. 8.

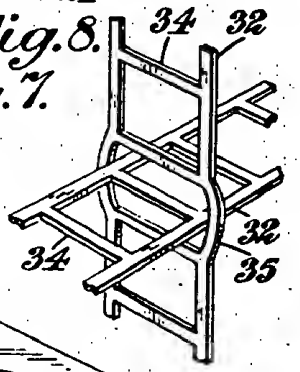
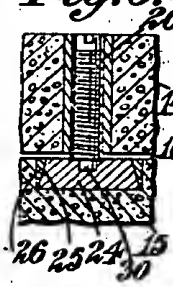


Fig. 7.

Fig. 6.



Malby & Sons, Photo-Litho

PATENT SPECIFICATION

Application Date: Aug. 9, 1940. No. 12835/40. **543,150**

Complete Specification Left: Sept. 9, 1941.

Complete Specification Accepted: Feb. 12, 1942.

PROVISIONAL SPECIFICATION

Improvements in or relating to Window and like Frames

I, WILFRED FELIX GOTCH, a British Subject, of 23, Oakhill Road, Ashtead, Surrey, do hereby declare the nature of this invention to be as follows:—

This invention concerns improvements in or relating to window frames, frames for doors or other pivoted panels hereinafter collectively referred to as "window structures" and has for an object to enable such frames to be formed from mouldable materials and yet permit easy assemblage of the window, door or like, in a surrounding frame and also to permit freedom of pivotal movement.

By mouldable materials are meant materials such as concrete, synthetic resins and like materials which harden or can be hardened after being given the desired shaping, but for brevity the word "concrete" will be used in this specification to mean all such suitable materials.

According to this invention, a window structure comprises a frame formed from concrete and mounted within an outer supporting frame by two axially aligned hinges, each of which hinges has a pin or the like carried by one of the frames and engaging a socket in the other frame and at least one of which hinges is so constructed as to permit movement between its pin and socket in an axial direction relatively to the frames to an extent sufficient to allow disengagement of said pin and socket. It will be appreciated with this arrangement engagement or disengagement of the pin and the socket may be effected when the frames are assembled one within the other.

Each of the frames may be provided with a socket, which sockets may be so arranged that the pin may either be housed solely in one of them or may extend into a part of each of them. Means may be provided for maintaining the pin in a required position. For example, the pin may be arranged in screw-threaded engagement with a sleeve (such, for example, as is sold under the Registered Trade Mark "Rawlplug") secured in a hole in one of the frames so as to be movable into and out of the socket in the other frame.

In one construction, the pin or the like may be slidable from a socket in one of the frames which is capable of completely housing it into a smaller socket where it may be retained by gravity. Alternatively, positive retaining means may be associated with the larger socket, for example a passage may extend through a member of the frame into the larger socket, and sealing material may be forced through the passage between the end of the pin and the space in the socket when the pin is in engagement with both sockets.

In this construction, the pin may be cup-shaped and the rim of the cup can be moved into the socket so that it bears on the bottom wall thereof and takes the end thrust of the hinge.

In an arrangement in which each of the frames is provided with a socket for accommodating the pin, either or each of said sockets may project beyond the face of the frame member which accommodates it so that the two sockets may bear upon one another and take the axial loading between the frames while the pin is arranged to take the transverse load to the axis of pivoting.

Alternatively, axial loading may be taken by an end face of the pin which engages a suitable bearing face formed in one of the sockets. With this arrangement when the hinge is provided with means for retaining the pin in a desired position, the retaining means may be so adjusted that there is little or no end play between the parts of the hinge and so that the inner frame is located within the outer without contact between their peripheral edges.

In certain of the arrangements referred to above, the socket may comprise a metal plate one face of which is formed with a hemi-spherical recess and the end of the pin may be shaped to fit the recess.

Alternatively the end face of the pin may be conical and may be arranged to engage a surface flanking a hole which constitutes the socket.

The pin and socket may be shaped so as to resist movement due to forces both in an axial direction and a radial direction. For example, the end of the pin may be formed

[*Price* 1/-]

with a reduced cylindrical portion so as to provide a shoulder, which reduced cylindrical portion engages a bore formed in the socket and which shoulder engages a shoulder encircling the bore. Alternatively, the pin may have a spherical end which is encircled by a flat shoulder, which shoulder engages a shoulder on the socket whereas the spherical end engages a spherical bearing face in the socket.

The axially movable member of the hinge is arranged so that it may be accessible at all times. For example, when a threaded hinge pin is employed, it is arranged to engage a hole extending completely through a member of the frame which hole is left unobscured and the end of the pin is slotted for engagement by a screwdriver.

The outer frame may also be formed from concrete having one of the hinge members inset within it.

It will be appreciated that in the mass production of concrete frames it is important for the parts of the hinges to be correctly assembled with the frames in order that the frames may correctly register with one another.

A feature of this invention consists in moulding in the frames recesses for accommodating and correctly registering the parts of the hinges. For example, in a case where the inner frame is to receive a sleeve which is engaged by the pin of the hinge, a suitable hole may be cast into which the sleeve may be inserted. Similarly, the outer frame may have moulded in it a recess for receiving the socket. Similarly, holes may be formed by casting for accommodating other fittings thereby avoiding machining the concrete frame after the concrete has set, which process might crack the concrete and weaken the frame.

The aforesaid sockets or other fittings may be secured in the recesses provided for them by a suitable grouting material but in the case where the hinge parts are provided with abutting end faces and means are provided for effecting axial adjustment between the said two parts, they are automatically retained within the recesses.

In any of the arrangements referred to above the concrete frames are reinforced with metal, and a feature of this invention consists in utilising as the reinforcement strips cut from scrap resulting from the punching or stamping of blanks from sheet metal. A particularly suitable form of scrap is that which results from stamping out rectangular blanks thereby providing a reticulated structure. The strips are so cut from this sheet as to provide a ladder-like member.

In a case where a concrete frame is required having a number of cross members forming openings, the aforesaid ladder-like reinforcements prior to their insertion in a mould are interconnected in the required configuration by either of the following methods.

The reinforcements are arranged in two sets: the longitudinal members of each reinforcement in one set of the ladder-like reinforcements are bent inwardly at those locations where they are required to cross the other set of reinforcements. Each reinforcement of the first set is then threaded through the spaces in the other set of reinforcements by inclining the reinforcement diagonally in relation to the spaces through which it is to be threaded and when the reinforcement is in the correct position it is rotated so that the inwardly and bent portions of its side walls engage the side walls of the other reinforcement. Alternatively, the side walls of one set of reinforcements may be outwardly bulged at those locations where the other set of reinforcements are required to cross them and said other set of reinforcements are threaded in turn through bulged sections which are brought into line with one another. By these means a reticulated reinforcement structure may be built up which may be inserted as a whole into the mould.

In employing reinforcements of scrap metal of the above character the hole for the pivot pin of the hinge may be arranged to register with a hole in the reinforcement. This ensures that the stresses imparted by the weight of the window on the hinges are advantageously distributed through the reinforced structure.

A window frame according to this invention may be formed as a single integral rectangular structure or it may be constructed from a number of separately formed rectangular frames which are subsequently suitably bonded together. In order to obtain a variety of shapes of frames by mass production methods, a number of sets of rectangular frames of different sizes may be provided which are capable of being bonded together to form the required shape and size of window. For example, there may be two sets of frames, the frames in one set being square and in the other rectangular, having one side double the length of the other and having its smaller side equal to the side of the square frame. A suitable size of square frame is one in which the sides are 1′ 8″, while the rectangular frame has its shorter side 1′ 8″ and its longer side 3′ 4″.

Dated this 9th day of August, 1940.

BOULT, WADE & TENNANT.
Chartered Patent Agents,
111 & 112, Hatton Garden,
London, E.C.1.

COMPLETE SPECIFICATION

Improvements in or relating to Window and like Frames

I, WILFRED FELIX GOUGH, a British Subject, of 23, Oakhill Road, Ashtead, Surrey, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention concerns improvements in or relating to window frames, frames for doors or other pivoted panels hereinafter collectively referred to as "window structures" and has for an object to enable such frames to be formed from concrete and yet permit easy assemblage of the window, door or like, in a surrounding frame and also to permit freedom of pivotal movement.

According to this invention, a window structure comprises a frame formed from concrete and mounted within an outer supporting frame by two axially aligned hinges, each of which hinges has a pin or the like carried by one of the frames and engageable with a socket in the other frame and at least one of which hinges is so constructed as to permit, for the purpose of assemblage, movement between its pin and socket in an axial direction relatively to the frames to an extent sufficient to allow disengagement of said pin and socket, which concrete frame is either cast around its hinge part or is precast with a recess for accommodating the hinge part. It will be appreciated with this arrangement that movement of the pin and the socket may be effected when the frames are assembled one within the other.

Each of the frames may be provided with a socket, which sockets may be so arranged that the pin may either be housed solely in one of them before assemblage of the frames but is arranged to extend into a part of each of them after assemblage. Means may be provided for maintaining the pin in the required positions during and after assembly. For example, the pin may be arranged in screw-threaded engagement with a sleeve (such, for example, as is sold under the Registered Trade Mark "Rawlplug") secured in a hole in one of the frames so that the pin is movable into and out of the socket in the other frame.

In one construction, the pin or the like may be slidable from an upper socket which completely houses it in one of the frames into a lower socket of smaller depth where it may be retained by gravity. Alternatively, positive retaining means may be associated with the larger socket, for example a passage may extend through a member of the frame into the larger socket, and sealing material may be forced through the passage between the end of the pin and the space in the socket when the pin is in engagement with both sockets.

In any of the arrangements referred to above the pin may be cup-shaped and the rim of the cup can be moved into the socket so that it bears on the bottom wall thereof and takes the end thrust of the hinge.

In an arrangement in which each of the frames is provided with a socket for accommodating the pin, either or each of said sockets may project beyond the face of the frame member which accommodates it so that the two sockets may bear upon one another and take the axial loading between the frames while the pin is arranged to take the transverse load to the axis of pivoting.

Alternatively, axial loading may be taken by an end face of the pin which engages a suitable bearing face formed in one of the sockets. With this arrangement when the hinge is provided with means for retaining the pin in a desired position, the retaining means may be so adjusted that there is little or no end play between the parts of the hinge and so that the inner frame is located within the outer without contact between their peripheral edges.

In certain of the arrangements referred to above, the socket may comprise a metal plate one face of which is formed with a hemispherical recess and the end of the pin may be shaped to fit the recess.

Alternatively the end face of the pin may be conical and may be arranged to engage a surface flanking a hole which constitutes the socket.

The pin and the socket may be shaped so as to resist movement due to forces both in an axial direction and a radial direction. For example, the end of the pin may be formed with a stepped cylindrical portion which is arranged to engage a

stepped bore which constitutes said socket. Alternatively, the pin may have a spherical end which is encircled by a flat shoulder, which shoulder engages a shoulder on the socket whereas the spherical end engages a spherical bearing face in the socket.

The axial movable member of the hinge or means for adjusting the pin and retaining it in the required location may be so arranged on the frame as to be readily accessible. For example, when a threaded hinge pin is employed, it is arranged to engage a hole extending completely through a member of the frame which hole is left unobscured and the end of the pin is slotted for engagement by a screwdriver.

The outer frame may also be formed from concrete having one of the hinge members inset within it.

It will be appreciated that in the mass production of concrete frames it is important for the parts of the hinges to be correctly assembled with the frames in order that the frames may correctly register with one another.

A feature of this invention consists in that the frames are precast with recesses for accommodating and correctly registering the parts of the hinges. For example, in a case where the inner frame is to receive a sleeve which is engaged by the pin of the hinge, a suitable hole may be cast into which the sleeve may be inserted. Similarly, the outer frame may have moulded in it a recess for receiving the socket. Similarly, holes may be formed by casting for accommodating other fittings thereby avoiding machining the concrete frame after the concrete has set, which process might crack the concrete and weaken the frame.

The aforesaid sockets or other fittings may be secured in the recesses provided for them by a suitable grouting material.

In any of the arrangements referred to above the concrete frames may be reinforced with metal, and the reinforcement may comprise strips cut from scrap resulting from the punching or stamping of blanks from sheet metal.

The following is a description of a number of embodiments to the invention reference being made to the accompanying drawings in which:—

Each of Figures 1 to 6 show alternative forms of hinges in position in the window frames which are shown partly in section, and

Figures 7 and 8 show a method of reinforcing the window frames.

Referring to the construction shown in Figure 1, the hinge comprises two interfitting cup shaped members 10 and 11 which are either accommodated in recesses 12 and 13 precast in the window frames 14 and 15 or are cast *in situ*. The cup shaped member 10 may be wholly accommodated in its recess before assemblage but is so dimensioned that it may be forced partly out of the recess 12 in its frame member into engagement with the cup shaped member 13. This may be effected by forcing cement through a passage 9 in the frame member 14 which passage communicates with the recess 12. The member 10 is arranged to extend sufficiently out of its recess so as to maintain a gap 16 between the two frames and thus support the weight of the inner frame on its rim which engages the bottom of the cup shaped member 13.

A similar form of hinge arrangement is arranged between the two upper parts of the frame and is in axial alignment with the lower hinge.

In the arrangement shown in Figure 2 the two cup shaped menibers 17 and 18 are of the same diameter and are arranged with their rims resting upon one another. They both project a short distance beyond the frames so as to provide the aforesaid gap 16. It will be noted that the depth of the upper cup shaped member 17 is greater than that of the lower. Located between the two cup shaped members is a hinge pin in the form of a cylindrical block the axial width of which is the same as the depth of the upper cup shaped member, and thus can be wholly housed within that member during assemblage by suitably disposing the frames. When the frames are assembled they may be moved to an upright position in which the block moves by gravity partly out of the cup shaped member 17 and engages the cup shaped member 18. The upper hinge may be provided in the same manuer but in this instance the outer frame member is provided with the larger cup shaped member.

In the arrangement shown in Figure 3 a threaded hinge pin 20 is arranged to extend through a sleeve 21 located in a hole in the frame member 14. The sleeve may be formed from a material sold under the trade name "Rawlplug". The threaded pin is provided with a spherical end 22 which engages a spherical socket formed in a block of metal 24. The block is provided with sloping sides 25 and is located in a recess precast in the frame member 15. It is held in position in this recess by grouting material 26. The upper end of the pin is provided with a slot 27 by which it may be rotated by means of a screwdriver.

The arrangement shown in Figure 4 is similar to that described above, but in

this instance the axial thrust on the hinge is taken by a shoulder 28 formed on the pin around the spherical end which shoulder engages with a flat face of the socket, the spherical end merely operating as a locating member.

In the arrangement shown in Figure 5 the end 29 of the pin is conical and engages the edge of a hole 30 formed in said block, 24. The conical face thus serves both as locating means and means for taking the end pressure. Alternatively as shown in Figure 6 the end of the pin is provided with a stepped cylindrical portion which engages a stepped bore in the block 24 whereby the shoulder between the two parts of the stepped cylindrical portion takes the weight of the window and the cylindrical part forms the locating means.

As indicated above in any of the arrangements the concrete frame may be reinforced with metal and a particularly suitable form of reinforcement is that resulting from the punching or stamping of blanks from sheet metal. A particularly suitable form of scrap is one from which rectangular blanks have been cut so as to provide a reticulated blank. Reinforcing strips are so cut from this sheet as to provide a ladder like member as shown in Figures 7 and 8. The reinforcement for the corners of the frames may be assembled in either of the ways shown in those figures. In the former construction the two side members of one of the inforcements are bent inwardly at 33 between two of the cross members 34. The reinforcement is then threaded through one of the spaces in the other inforcement by arranging it diagonally in that space and then turning it into the position shown in Figure 7. Alternatively as shown in Figure 8 the side members of one of the reinforcements may be bent outwardly at 35 and the other reinforcement may be passed through the bulge thus formed.

The reinforcements are so disposed in the frames that the pivot pin of the hinge in the one frame is arranged to register with a hole in the reinforcement, and the socket registers with a hole in the reinforcement of the other frame. This ensures that the stresses imparted by the weight of the window on the hinges are advantageously distributed throughout the reinforced structure.

A window frame according to this invention may be formed as a single integral rectangular structure or it may be constructed from a number of separately formed rectangular frames which are subsequently suitably bonded together. In order to obtain a variety of shapes of frames by mass production methods, a number of sets of rectangular frames of different sizes may be provided which are capable of being bonded together to form the required shape and size of window. For example, there may be two sets of frames, the frames in one set being square and in the other rectangular, having one side double the length of the other and having its smaller side equal to the side of the square frame. A suitable size of square frame is one in which the sides are 1′ 8″ while the rectangular frame has its shorter side 1′ 8″ and its longer side 3′ 4″.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A window structure comprising a frame formed from "concrete" and mounted within an outer-supporting frame by two axially aligned hinges, each of which hinges has a pin or the like carried by one of the frames and engageable with a socket in the other frame, and at least one of which hinges is so constructed as to permit for the purpose of assemblage movement between its pin and socket in an axial direction relatively to the frame, which concrete frame is either cast around its hinge part or is precast with a recess for accommodating the hinge part.

2. A window structure according to claim 1, wherein each of the frames is provided with a socket, which sockets are so arranged that the pin may either be housed solely in one of them before assemblage of the same, but may be arranged to extend into a part of each of them after assemblage.

3. A window structure according to either of the preceding claims, wherein means are provided for maintaining the pin in the required position after assemblage.

4. A window structure according to claim 3, wherein the means for maintaining the pin in the required position comprises a screw-threaded engagement between the pin and a sleeve secured in a hole in one of the frames so that the pin is movable into and out of the socket in the other frame.

5. A window structure according to claim 2, wherein said pin or the like is slidable from an upper socket which completely houses it in one of the frames into a lower socket of smaller depth, where it is retained by gravity.

6. A window structure according to claim 2 and claim 3, wherein a passage is arranged to extend through a member of the frame into the larger of the two

sockets and sealing material is forced through the passage between the end of the pin and the space in the socket when the pin is in engagement with both sockets.

7. A window structure according to any of the preceding claims, wherein said pin is cup-shaped and the rim of the cup is arranged to be moved into the socket so that it bears on a bottom wall thereof so as to take the end thrust of the hinge.

8. A window structure according to any of the preceding claims 1 to 6 and having a socket in each frame for accommodating the pin, either or each of which sockets projects beyond the face of the frame member which accommodates it so that the two sockets bear upon one another and take the axial loading between the frames while the pin is arranged to take the transverse load to the axis of pivoting.

9. A window structure according to any of the preceding claims 1 to 6, wherein an end face of the pin is arranged to engage a suitable bearing space formed in one of the sockets for withstanding the axial loading.

10. A window structure according to claim 1, wherein said socket comprises a metal plate, one face of which is formed with a hemispherical recess and wherein the end of the pin is shaped to fit said recess.

11. A window structure according to claim 1, wherein the end face of the pin is conical and is arranged to engage a surface flanking a hole which constitutes said socket.

12. A window structure according to claim 1 wherein the end of the pin is provided with a stepped cylindrical portion which is arranged to engage a stepped bore which constitutes said socket.

13. A window structure according to claim 1, wherein said pin is provided with a spherical end encircled by a flat shoulder, which shoulder engages a shoulder on the socket, whereas the spherical end engages a spherical bearing face in the socket.

14. A window structure according to claim 1 or any of claims 10 to 13, wherein the means for adjusting the position of said pin or the means for retaining it in the required location are so arranged in the frame as to be readily accessible.

15. A window structure according to claim 4 and claim 13 wherein said threaded pin is arranged to engage a hole extending completely through a member of the frame, which hole is left unobscured and the end of the pin is slotted for engagement by a screw-driver.

16. A window structure according to any of the preceding claims wherein both the inner and outer frames are moulded from concrete and have the hinged members inset within them.

17. A window structure according to claim 16 wherein the metal parts of the hinges are secured in the recesses as provided for them by suitable grouting material.

18. A window structure according to any of the preceding claims wherein said frames are reinforced with metal.

19. A window structure according to claim 17 wherein the metal reinforcement comprises strips cut from scrap resulting from the punching or stamping of blanks from sheet metal.

20. A window structure according to claim 18 wherein the metal reinforcements are arranged so that the pin or socket of the hinged members may pass through a hole in the reinforcements.

21. A hinged window structure substantially as described with reference to the accompanying drawing.

Dated this 9th day of September, 1941.

BOULT, WADE & TENNANT,
111 & 112, Hatton Garden, London, E.C.1,
Chartered Patent Agents.

Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1942.